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EXAMINER	
FAULK, DEVONA E	

ART UNIT	PAPER NUMBER
2614	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/051,757	DURANT, ERIC A.	
	Examiner	Art Unit	
	DEVONA E. FAULK	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,9-16 and 20-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *12-16,27-35* is/are allowed.

6)☒ Claim(s) *1-4,9-11 and 20-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 7/21/08 have been fully considered but they are not persuasive. Regarding the claims, particularly claims 20-23,26 the applicant only asserts that he is unable to find cited portions of the claim language in the cited references. The examiner disagrees and below clearly identifies what is reading on each limitation of the claims. Regarding the fact that Holland was cited to be used for a new grounds of rejection for claims 20-24 and 26, the asserts that this was an error by the examiner, a typo and does not change the rejection that was set forth for these claims. The art that was applied reads on the claim language.

Regarding claim 20, the applicant asserts that

" With respect to independent claim 20, Applicant is unable to find in the cited portions of the cited references, among other things, a teaching or suggestion of a hearing aid including a memory having a first population stored therein, the first population comprising a plurality of parent sets, each of the parent sets having at least one parameter, a toggle device for toggling between a first pair of the plurality of parent sets, a select indicator for selecting a preferred one set of the first pair, and a processor for ranking a hierarchy of the plurality of parent sets, as recited in claim 20."

The examiner disagrees. On page 10, lines 5-11, of the specification, the applicant has defined a population as a plurality of sets and a set as one or more parameters. The rejection of claim 20 reads as follows:

Regarding claim 20, Weinfurtner discloses a hearing aid comprising:
a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent sets having at least one parameter (each parameter set comprises hearing programs

corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);

a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set, Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47);

a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8); and

a processor (46, Figure 5).

Weinfurtner discloses a plurality of parent sets and a processor.

Weinfurtner fails to disclose that the processor ranks a hierarchy of the plurality of parent sets.

Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm (column 4, lines 42-65; column 6, lines 17-27;column 42, lines 8-48; ranking data is implicit to how a genetic algorithm functions). A genetic algorithm (GA) is a search technique used in computing to find exact or approximate solutions to optimization and search problems. It would have been obvious to modify Weinfurtner by ranking the plurality of parent sets for the purpose of improving the hearing aid fit for the user.

The examiner has clearly defined how population and set are being defined by the examiner as well as other features of the claim. Weinfurtner as modified reads on the claim language as recited.

Regarding claim 21, the applicant asserts that

"With respect to independent claim 21, Applicant is unable to find in the cited portions of the cited references, among other things, a teaching or suggestion of a hearing aid including a memory having a first population stored therein, the first population comprising a plurality of parent sets, each of the parent sets having at least one parameter, a toggle device for toggling between a first pair of the plurality of parent sets, a select indicator for selecting a preferred one set of the first pair, and a processor for assigning a probability of selection by the select indicator to the plurality of parent sets, as recited in claim 21."

The examiner disagrees. On page 10, lines 5-11, of the specification, the applicant has defined a population as a plurality of sets and a set as one or more parameters. The rejection of claim 21 reads as follows:

Regarding claim 21, Weinfurtner discloses a hearing aid comprising:

a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent sets having at least one parameter (each parameter set comprises hearing programs corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);

a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set, Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47);

a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8); and

a processor (46, Figure 5).

Weinfurtner discloses a plurality of parent sets.

Weinfurtner fails to disclose that the processor assigns a probability of selection to the plurality of parent sets.

Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm (column 66, lines 17-27). Watanabe discloses using a genetic algorithm and assigning a probability of selection to a data set (Figure 9; column 26, line 45 -column 27, line 10). A genetic algorithm (GA) is a search technique used in computing to find exact or approximate solutions to optimization and search problems. Genetic algorithms are used to approximate solutions to optimization problems and are well known in the art. It would have been obvious to modify Weinfurtner by applying the probability of selection techniques as taught by Watanabe for the purpose of better optimizing the hearing aid fit for a user.

The examiner has clearly defined how the features of the claim are read upon.

Weinfurtner as modified reads on the claim language as recited.

Regarding claim 22, the applicant asserts that

"With respect to independent claim 22, Applicant is unable to find in the cited portions of the cited references, among other things, a teaching or suggestion of a hearing aid including a memory having a first population stored therein, the first population comprising a plurality of parent sets, each of the parent sets having at least one parameter, a toggle device for toggling between a first pair of the plurality of parent sets, and a select indicator for selecting a preferred one set of the first pair, where the plurality of parent sets comprises at least a first, second and third set, further comprising

a genetic algorithm for deciding which of the first, second and third sets becomes the first pair, as recited in claim 22."

The examiner disagrees. On page 10, lines 5-11, of the specification, the applicant has defined a population as a plurality of sets and a set as one or more parameters. The rejection of claim 22 reads as follows:

Regarding claim 22, Weinfurtner discloses a hearing aid comprising:

a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent sets having at least one parameter (each parameter set comprises hearing programs corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);

a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set, Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47);

a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8); and

wherein the plurality of parent sets comprises at least a first, second and third set (E1-E4 are parent sets; column 5, lines 1-9).

Weinfurtner discloses a plurality of parent sets.

Weinfurtner fails to disclose a genetic algorithm for deciding which of the first, second and third sets becomes the first pair

Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm (column 66, lines 17-27). Watanabe discloses using a genetic algorithm and assigning a probability of selection to a data set (Figure 9; column 26, line 45 -column 27, line 10). Watanabe further teaches of rearranging an order of presentation (column 14, lines 25-30). Rearranging an order of presentation reads on deciding on which set gets presented or chosen first. It would have been obvious to modify Weinfurtner by deciding which of the first, second or third sets become the first pair for the purpose of better optimizing the hearing aid fit for a user.

The examiner has clearly defined how the features of the claim are read upon.

Weinfurtner as modified reads on the claim language as recited.

Regarding claim 23, the applicant asserts that

With respect to independent claim 23, Applicant is unable to find in the cited portions of the cited references, among other things, a teaching or suggestion of a hearing aid including a memory having a first population stored therein, the first population comprising a plurality of parent sets, each of the parent sets having at least one parameter, a toggle device for toggling between a first pair of the plurality of parent sets, a select indicator for selecting a preferred one set of the first pair, and a genetic algorithm operator for performing one of mutation and crossover on at least one set of the plurality of parent sets thereby forming a child set, as recited in claim 23.

The examiner disagrees. On page 10, lines 5-11, of the specification, the applicant has defined a population as a plurality of sets and a set as one or more parameters. The rejection of claim 23 reads as follows:

Regarding claim 23, Weinfurtner discloses a hearing aid comprising:
a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent sets having at least one parameter (each parameter set comprises hearing programs corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);
a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set, Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47);
a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8); and
a processor (control processing unit 46, Figure 5).
Weinfurtner discloses a plurality of parent sets.
Weinfurtner fails to disclose a genetic algorithm for performing one of mutation and crossover on at least one set of the plurality of parent sets thereby forming a child set.
A genetic algorithm (GA) is a search technique used in computing to find exact or approximate solutions to optimization and search problems. Genetic algorithms are used to approximate solutions to optimization problems and are well known in the art.
Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing

characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm (column 66, lines 17-27; column 4, lines 42-65; column 42, lines 8-48). Watanabe discloses using genetic algorithm and using mutation and crossover on at least one parent set (Watanabe, column 42, lines 8-48; Figures 67 and 69; a child set is implicitly formed). It would have been obvious to modify Weinfurtner by performing crossover and mutation on the plurality of parent sets for the purpose of improving the hearing aid fit for the user.

The examiner has clearly defined how the features of the claim are read upon.

Weinfurtner as modified reads on the claim language as recited.

Regarding claim 26, the applicant asserts that

With respect to independent claim 26, Applicant is unable to find in the cited portions of the cited references, among other things, a teaching or suggestion of a hearing aid including a memory having a first population stored therein, the first population comprising a plurality of parent sets, each of the parent sets having at least one parameter, a toggle device for toggling between a first pair of the plurality of parent sets, and a select indicator for selecting a preferred one set of the first pair, where the toggle device toggles between a plurality of pairs of the plurality of parent sets, further comprising a processor for converging the plurality of pairs to a single solution set, as recited in claim 26.

The examiner disagrees. On page 10, lines 5-11, of the specification, the applicant has defined a population as a plurality of sets and a set as one or more parameters. The rejection of claim 26 reads as follows:

Regarding claim 26, Weinfurtner discloses a hearing aid comprising:
a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent sets having at least one parameter (each parameter set comprises hearing programs corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);
a toggle device for toggling between a first pair of the plurality of parent sets and toggles between a plurality of pairs of parent sets (keys 48 allow the user to select a hearing situation, i.e. a parameter set, when the user chooses a key 48 he is toggling

between the plurality of pairs of parent sets; Figure 3; column 5, lines 1-7; column 6, lines 25-32 and 41-47; Figure 3);

a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8); and

a processor (46, Figure 5).

Weinfurtner discloses a plurality of parent sets and a processor.

Weinfurtner fails to disclose that the processor converges the plurality of pairs to a single solution set.

Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm column 66, lines 17-27; column 4, lines 42-65; column 42, lines 8-48). Watanabe teaches that in the genetic algorithm operations are iteratively performed until each solution vector in the solution vector set P converges to a nearly optimal solution to the problem being solved column 2, lines 37-40). Watanabe therefore discloses converging data to a single solution set. It would have been obvious to modify Weinfurtner by converging the data to a single solution set for the purpose of better optimizing the hearing aid fit for a user.

The examiner has clearly defined how the features of the claim are read upon.

Weinfurtner as modified reads on the claim language as recited.

Regarding claim 1, the applicant asserts that

"Applicant respectfully traverses the rejection based on a combination of Weinfurtner, Watanabe and Holland, since there is no teaching in Weinfurtner, Watanabe or Holland of a system of fitting a hearing aid as taught in the specification or recited in the claims. Further, it is respectfully submitted that Holland does not relate to hearing aid fitting as provided by the present application and thus it is respectfully submitted that Holland is non-analogous art, as it relates to an adaptive computer system using a bucket brigade algorithm. Applicant can find no mention in Holland of any application relating to hearing aids. Clarification or withdrawal of the reference is respectfully requested in the next Official Communication.

With respect to independent claim 1, Applicant is unable to find in the cited portions of the cited references, among other things, a teaching or suggestion of an apparatus for fitting a hearing aid by its wearer including a memory adapted to store a first population comprising a plurality of parent sets, a toggle device adapted to toggle between a pair of the plurality of parent sets, a select indicator for selecting a preferred one set of the pair, a communications link adapted to connect with the hearing aid, and a processor adapted to provide signals to the hearing aid to change operation of the hearing aid

based on each parent set, to allow the wearer to select one preferred set for each pair of parent sets, to record a ranking of parent sets, assign probabilities of selection of parent sets, crossover and/or mutate at least one parent set, and replace weakest parent sets with a child set, as recited in claim 1. Claims 2-4, 10 and 11 depend directly on independent claim 1 and are believed to be in condition for allowance at least for the reasons provided with respect to claim 1."

The rejection of claim 1 reads as follows:

Regarding claim 1, Weinfurtner discloses an apparatus for fitting a hearing aid comprising:

a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent sets having at least one parameter (each parameter set comprises hearing programs corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);

a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47);

a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8);

a communications link adapted to connect with a hearing aid (wireless data transmission path 24; column 4, lines 50-51) and

a processor adapted to provide signals to the hearing aid to change operation of the hearing aid based on each parent set (control processing unit 46, Figure 5; column 6, lines 5-10) to allow the wearer to select one preferred set for each pair of parent sets ; column 6, lines 5-10).

Weinfurtner discloses a plurality of parent sets.

Weinfurtner fails to disclose that the processor is adapted to record a ranking of parent sets, assign probabilities of selection of parent sets, crossover and/or mutate at least one parent set and replace weakest parent sets with a child set. Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm (column 66, lines 17-27; column 4, lines 42-65; column 42, lines 8-48). Watanabe further teaches of recording a ranking of parent sets (ranking data is implicit to how a genetic algorithm functions), assign probabilities of selection of parent sets (column 26, lines 18-32; column 27, lines 1-10), crossover and/or mutate at least one parent set Watanabe discloses using genetic algorithm and using mutation and crossover on at least one parent set (column 42, lines 8-48; Figures 67 and 69). It would have been obvious to modify Weinfurtner to provide the processor the capability of recording a ranking of parent sets, assign

> *probabilities of selection of parent sets, crossover and/or mutate at least one parent set for the purpose of improving the hearing aid fit for the user. Weinfurtner as modified by Watanabe discloses parent sets and a child set. Weinfurtner as modified fails to disclose replacing weakest parent sets with a child set. Holland teaches of crossover involving the selection of a string position at random, splitting parent classifiers at a position, and exchanging parts to form two new child classifiers which replace the weakest (lowest strength) classifiers (column 2., line 65-column 3, line 3). A genetic algorithm is a search technique used in computing to find exact or approximate solutions to optimization and search problems and can be applied to various data sets. It would have been obvious to modify Weinfurtner as modified so that the processor can replace the weakest parent sets with a child set in order to provide the strongest or most optimum condition to the user thus improving the hearing fit for the user.*

In response to applicant's argument that Holland is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Holland teaches of crossover involving the selection of a string position at random, splitting parent classifiers at a position, and exchanging parts to form two new child classifiers which replace the weakest (lowest strength) classifiers (column 2., line 65-column 3, line 3). A genetic algorithm is a search technique used in computing to find exact or approximate solutions to optimization and search problems and can be applied to various data sets. .This is done by a processor. Therefore any processor is capable of performing function. Therefore Holland is reasonably pertinent to the particular problem.

Regarding the applicant's assertion that he is unable to find in the cited references the limitations of the claims, the examiner disagrees. On page 10, lines 5-11, of the

specification, the applicant has defined a population as a plurality of sets and a set as one or more parameters. The examiner has clearly defined how the features of the claim are read upon. Weinfurtner as modified reads on the claim language as recited. The examiner is maintaining the rejections as set forth in the previous office action.

2. Claims 12-16 and 27-35 were indicated as allowable and remain in allowable form.

3. Claims 5-8,17-19 and 36-43 are cancelled.

4. The indicated allowability of claims 9 and 25 is withdrawn in view of the newly discovered reference(s) to Weinfurtner. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 20-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weinfurtner et al. (US 6,035,050) in view of Watanabe et al. (US 6,148,274).

Regarding claim 20, Weinfurtner discloses a hearing aid comprising:

a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent

sets having at least one parameter (each parameter set comprises hearing programs corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);

a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set, Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47);

a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8); and

a processor (46, Figure 5).

Weinfurtner discloses a plurality of parent sets and a processor.

Weinfurtner fails to disclose that the processor ranks a hierarchy of the plurality of parent sets.

Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm (column 4, lines 42-65; column 6, lines 17-27;column 42, lines 8-48; ranking data is implicit to how a genetic algorithm functions). A genetic algorithm (GA) is a search technique used in computing to find exact or approximate solutions to optimization and search problems. It would have been obvious to modify Weinfurtner by ranking the plurality of parent sets for the purpose of improving the hearing aid fit for the user.

Regarding claim 21, Weinfurtner discloses a hearing aid comprising:

a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent sets having at least one parameter (each parameter set comprises hearing programs corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);

a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set, Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47);

a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8); and

a processor (46, Figure 5).

Weinfurtner discloses a plurality of parent sets.

Weinfurtner fails to disclose that the processor assigns a probability of selection to the plurality of parent sets.

Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm (column 66, lines 17-27). Watanabe discloses using a genetic algorithm and assigning a probability of selection to a data set (Figure 9; column 26, line 45 -column 27, line 10). A genetic algorithm (GA) is a search technique used in computing to find exact or approximate solutions to optimization and search problems. Genetic algorithms are

used to approximate solutions to optimization problems and are well known in the art. It would have been obvious to modify Weinfurtner by applying the probability of selection techniques as taught by Watanabe for the purpose of better optimizing the hearing aid fit for a user.

Regarding claim 22, Weinfurtner discloses a hearing aid comprising:

a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent sets having at least one parameter (each parameter set comprises hearing programs corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);

a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set, Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47);

a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8); and

wherein the plurality of parent sets comprises at least a first, second and third set (E1-E4 are parent sets; column 5, lines 1-9).

Weinfurtner discloses a plurality of parent sets.

Weinfurtner fails to disclose a genetic algorithm for deciding which of the first, second and third sets becomes the first pair

Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm (column 66, lines 17-27). Watanabe discloses using a genetic algorithm and assigning a probability of selection to a data set (Figure 9; column 26, line 45 -column 27, line 10). Watanabe further teaches of rearranging an order of presentation (column 14, lines 25-30). Rearranging an order of presentation reads on deciding on which set gets presented or chosen first. It would have been obvious to modify Weinfurtner by deciding which of the first, second or third sets become the first pair for the purpose of better optimizing the hearing aid fit for a user.

Regarding claim 23, Weinfurtner discloses a hearing aid comprising:

a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent sets having at least one parameter (each parameter set comprises hearing programs corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);

a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set, Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47);

a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8); and

a processor (control processing unit 46, Figure 5).

Weinfurtner discloses a plurality of parent sets.

Weinfurtner fails to disclose a genetic algorithm for performing one of mutation and crossover on at least one set of the plurality of parent sets thereby forming a child set.

A genetic algorithm (GA) is a search technique used in computing to find exact or approximate solutions to optimization and search problems. Genetic algorithms are used to approximate solutions to optimization problems and are well known in the art.

Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm (column 66, lines 17-27; column 4, lines 42-65; column 42, lines 8-48). Watanabe discloses using genetic algorithm and using mutation and crossover on at least one parent set (Watanabe, column 42, lines 8-48; Figures 67 and 69; a child set is implicitly formed). It would have been obvious to modify Weinfurtner by performing crossover and mutation on the plurality of parent sets for the purpose of improving the hearing aid fit for the user.

Regarding claim 24, Weinfurtner as modified discloses a genetic algorithm for replacing one of the plurality of parent sets in the first population with the child set thereby forming a second population. Watanabe further discloses a genetic algorithm

and using mutation and crossover on at least one parent set (Watanabe, column 42, lines 8-48; Figures 67 and 69). A child set is implicitly formed. The child set reads on second population All elements of claim 24 are comprehended by the rejection of claim 23.

Regarding claim 25, Weinfurtner as modified a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47). It is obvious that the toggle device would be able to toggle between a second pair of parent sets from a second population. It would have been obvious to modify Weinfurtner so that the toggle device can toggle between a second pair of parent sets in a second population for the benefit of providing more options to the user.

Regarding claim 26, Weinfurtner discloses a hearing aid comprising:

a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent sets having at least one parameter (each parameter set comprises hearing programs corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);

a toggle device for toggling between a first pair of the plurality of parent sets and toggles between a plurality of pairs of parent sets (keys 48 allow the user to select a hearing situation, i.e. a parameter set, when the user chooses a key 48 he is toggling

between the plurality of pairs of parent sets; Figure 3; column 5, lines 1-7; column 6, lines 25-32 and 41-47; Figure 3);

a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8); and

a processor (46, Figure 5).

Weinfurtner discloses a plurality of parent sets and a processor.

Weinfurtner fails to disclose that the processor converges the plurality of pairs to a single solution set.

Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm column 66, lines 17-27; column 4, lines 42-65; column 42, lines 8-48). Watanabe teaches that in the genetic algorithm operations are iteratively performed until each solution vector in the solution vector set P converges to a nearly optimal solution to the problem being solved column 2, lines 37-40). Watanabe therefore discloses converging data to a single solution set. It would have been obvious to modify Weinfurtner by converging the data to a single solution set for the purpose of better optimizing the hearing aid fit for a user.

7. Claim 1-4, 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weinfurtner et al. (US 6,035,050) in view of Watanabe et al. (US 6,148,274) in further view of Holland et al. (US 4,697,242).

Regarding claim 1, Weinfurtner discloses an apparatus for fitting a hearing aid comprising:

a memory having a first population (60, Figure 5; the plurality of parameter sets read on population; column 6, lines 34-39) stored therein, the first population comprising a plurality of parent sets (each parameter set reads on parent set), each of the parent sets having at least one parameter (each parameter set comprises hearing programs corresponding to different hearing environments, i.e. at work, listening to music at home; column 6, lines 26-30);

a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47);

a select indicator for selecting a preferred one set of the first pair (keys 50 allows the user to allocate a parameter set, Figure 3; column 5, lines 5-8);

a communications link adapted to connect with a hearing aid (wireless data transmission path 24; column 4, lines 50-51) and

a processor adapted to provide signals to the hearing aid to change operation of the hearing aid based on each parent set (control processing unit 46, Figure 5; column 6, lines 5-10) to allow the wearer to select one preferred set for each pair of parent sets ; column 6, lines 5-10).

Weinfurtner discloses a plurality of parent sets.

Weinfurtner fails to disclose that the processor is adapted to record a ranking of parent sets, assign probabilities of selection of parent sets, crossover and/or mutate at least one parent set and replace weakest parent sets with a child set.

Watanabe discloses an optimization adjusting method that can be applied to the problem of adjusting the characteristics of a hearing aid to match the hearing characteristics of the wearer (user) of the hearing aid that uses a genetic algorithm (column 66, lines 17-27; column 4, lines 42-65; column 42, lines 8-48). Watanabe further teaches of recording a ranking of parent sets (ranking data is implicit to how a genetic algorithm functions), assign probabilities of selection of parent sets (column 26, lines 18-32; column 27, lines 1-10), crossover and/or mutate at least one parent set Watanabe discloses using genetic algorithm and using mutation and crossover on at least one parent set (column 42, lines 8-48; Figures 67 and 69). It would have been obvious to modify Weinfurtner to provide the processor the capability of recording a ranking of parent sets, assign probabilities of selection of parent sets, crossover and/or mutate at least one parent set for the purpose of improving the hearing aid fit for the user.

Weinfurtner as modified by Watanabe discloses parent sets and a child set.

Weinfurtner as modified fails to disclose replacing weakest parent sets with a child set. Holland teaches of crossover involving the selection of a string position at random, splitting parent classifiers at a position, and exchanging parts to form two new child classifiers which replace the weakest (lowest strength) classifiers (column 2., line 65-column 3, line 3). A genetic algorithm is a search technique used in computing to

find exact or approximate solutions to optimization and search problems and can be applied to various data sets. This is done by a processor. Therefore any processor is capable of performing function. It would have been obvious to modify Weinfurtner as modified so that the processor can replace the weakest parent sets with a child set in order to provide the strongest or most optimum condition to the user thus improving the hearing fit for the user.

Regarding claim 2, Weinfurtner as modified by Watanabe and Holland discloses wherein each parent set of the plurality of parent sets comprises more than one parameter (each parameter set reads on a parent set and each parameter set discloses more than one parameter; Weinfurtner; column 6, lines 18-20). All elements of claim 2 are comprehended by the rejection of claim 1.

Regarding claim 3, Weinfurtner as modified by Watanabe and Holland discloses wherein the communications link is a wireless link (Weinfurtner; wireless data transmission path 24; column 4, lines 50-51).

Regarding claim 4, Weinfurtner as modified by Watanabe and Holland discloses a memory for storing a hierarchy of the plurality of parent sets. Weinfurtner as modified fails to disclose that the memory is a flash memory. The examiner takes official notice that flash memory was well known in the art at the time of the invention. Flash memory is non-volatile, which means that it does not need power to maintain the information stored in the chip. It would have been obvious to modify Weinfurtner as modified so that the memory is a flash memory for the benefit of providing a hearing aid that uses less power.

Regarding claim 9, Weinfurtner as modified a toggle device for toggling between a first pair of the plurality of parent sets (keys 48 allows the user to select a hearing situation, i.e. parameter set Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 44-47). It is obvious that the toggle device would be able to toggle between a second pair of parent sets from a second population. It would have been obvious to modify Weinfurtner so that the toggle device can toggle between a second pair of parent sets in a second population for the benefit of providing more options to the user.

Regarding claim 10, Weinfurtner as modified by Watanabe and Holland discloses wherein the toggle device toggles between a plurality of pairs of the parent sets (Weinfurtner discloses keys 48 that allow the user to select a hearing situation, i.e. a parameter set, there are 4 parameter sets; when the user chooses a key 48 he is toggling between the plurality of pairs of parent sets; Figure 3; column 5,lines 1-7; column 6, lines 25-32 and 41-47), further comprising a processor for converging the plurality of pairs to a single solution. (Watanabe teaches that in the genetic algorithm operations are iteratively performed until each solution vector in the solution vector set P converges to a nearly optimal solution to the problem being solved ,column 2, lines 37-40. Watanabe therefore discloses converging data to a single solution set). All elements of claim 10 are comprehended by the rejection of claim 1.

Regarding claim 11, Weinfurtner, Watanabe and Holland disclose a hearing aid (Weinfurtner; hearing aid 10; column 4, lines 43-45) fitted by the apparatus according to claim 1. (See Weinfurtner, Watanabe and Holland as applied to claim 1).

Allowable Subject Matter

10. Claims 12-16, 27-35 are allowed.

The following is an examiner's statement of reasons for allowance: Regarding claims 12 ,22,27,31,32 and 34 prior art Weinfurtner et al. (US 6,035,050) discloses a hearing aid comprising: a memory having parameters stored ;a toggle device (Figure 3; column 5,lines 1-7);a select indicator (50, Figure 3; column 5, lines 5-8); and a processor (46, Figure 5). Prior art Watanabe et al. (US 6,148,274) discloses an optimization adjusting method that uses a genetic algorithm (column 4, lines 42-65; column 42, lines 8-48; ranking data is implicit to how a genetic algorithm functions). Watanabe discloses using genetic algorithm and using mutation and crossover on at least one parent set (Watanabe, column 42, lines 8-48; Figures 67 and 69). Prior art Takagi et al. (US 7,343,021) discloses an optimum solution method, hearing aid fitting apparatus utilizing the optimum solution method and system of optimization adjusting method and apparatus. Prior art Hagen et al. (US 6,888,948) discloses a portable system programming hearing aids. Generally the prior art teaches of using genetic algorithms to provide optimization. Darrel Whitely discloses a genetic algorithm tutorial.

Regarding claim 12, the prior art or combination thereof fails to disclose or make obvious a select indicator for selecting a preferred one of the first and second set in the each of the plurality of pairs; a genetic algorithm for replacing one of the plurality of parent sets in the first population with the child set thereby forming a second population

wherein the toggle device toggles between another pair of sets, the another pair being selected from the second population.

Regarding claim 27, the prior art or combination thereof fails to disclose or make obvious the first pair comprising a first and second set and being presented with assistance of the hearing aid; reselecting a first preference between the first and second sets of the first pair; presenting a second pair, the second pair comprising the child set and a third set, the third set being selected from the second population but not being the child set; selecting a second preference between the child set and the third set of the second pair.

Regarding claim 31, the prior art or combination thereof fails to disclose or make obvious the first pair comprising a first and second set and being presented with assistance of the hearing aid; selecting a first preference between the first and second sets of the first pair; presenting a second pair of sets from the parent sets, the second pair comprising a third and fourth set; selecting a second preference between the third and fourth sets of the second pair; operating on one set of the plurality of parent sets to obtain a child set, the child set being one of a mutation and crossover of the one set, the child set having at least one child parameter; replacing one of the plurality of parent sets of the first population with the child set to form a second population;

presenting a third pair of sets, the third pair comprising the child set and a fifth set, the fifth set being selected from the second population but not being the child set; selecting a third preference between the child set and the fifth set;

converging on a solution set, the solution set being one of the first, second, third, fourth,

fifth and child sets; and updating the initial prescription with one of the at least one parent and child parameters.

Regarding claim 32, the prior art or combination thereof fails to disclose or make obvious the genetic algorithm selecting which of the parent sets becomes the first and second set; indicating a preference to the genetic algorithm between the first and second sets of the first pair; replacing one of the plurality of parent sets of the first population with the child set to form a second population; presenting a second pair, the second pair comprising the child set and a third set, the third set being selected from the second population but not being the child set, the genetic algorithm selecting which set of the second population becomes the third set; indicating a second preference to the genetic algorithm between the child set and the third set of the second pair; and converging on a solution set, the solution set being one of the first, second, third and child sets.

Regarding claim 34, the prior art or combination thereof fails to disclose or make obvious the genetic algorithm selecting which of the plurality of parent sets becomes the first and second set; indicating a first preference to the genetic algorithm between the first and second sets of the first pair; presenting a second pair of sets from the parent sets, the second pair comprising a third and fourth set, the genetic algorithm selecting which of the plurality of parent sets becomes the third and fourth sets; indicating a second preference to the genetic algorithm between the third and fourth sets of the second pair; operating on one set of the plurality of parent sets with a genetic algorithm operator to obtain a child set, the child set being one of a mutation and

crossover of the one set, the child set having at least one child parameter; replacing one of the plurality of parent sets of the first population with the child set to form a second population; presenting a third pair of sets, the third pair comprising the child set and a fifth set, the fifth set being selected from the second population but not being the child set, the genetic algorithm selecting which set of the second population becomes the fifth set; indicating a third preference to the genetic algorithm between the child set and the fifth set; converging on a solution set, the solution set being one of the first, second, third, fourth, fifth and child sets; and updating the initial setting with one of the at least one parent and child parameters selected from the solution set.

Therefore, the prior art or combination thereof fails to disclose or make obvious an apparatus for fitting a hearing aid, a hearing aid, a method for fitting a hearing aid as claimed, a method of using a genetic algorithm in a system and a method of perceptually tuning a system using a genetic algorithm as claimed.

Claims 13-16, 28-30, 33 and 35 are allowed due to dependency on claims 12,27,32 and 34.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVONA E. FAULK whose telephone number is (571)272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devona E. Faulk/
Examiner, Art Unit 2614

/Vivian Chin/
Supervisory Patent Examiner, Art Unit 2614

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